

# A model of dengue transmission with *Wolbachia*-free and *Wolbachia*-infected mosquitoes

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## ABSTRACT

Dengue, a vector-borne disease, is transmitted to humans through the bite of a female infected mosquito (*Aedes aegypti* or *Aedes albopictus*). There are two ways by which *Wolbachia*, a bacterium, can reduce dengue infection. First, the *Wolbachia* inhibits the viral replication inside the hosts and hence affects the ability of mosquitoes to transmit the disease. Secondly, *Wolbachia* reduces the lifespan of the mosquitoes and hence less number of mosquitoes survive the extrinsic incubation period and become infectious to transmit the virus to susceptible humans. We developed a deterministic model that incorporates the interaction of hosts (humans) with wild and *Wolbachia*-infected mosquitoes. In this talk, I will discuss how the basic reproduction number  $R_0$  depends on different parameters related to the *Wolbachia* dynamics. I will also discuss the local and global asymptotic stability of different disease (dengue)-free equilibrium points of the model.

**Keywords:** *Wolbachia*, Dengue, Basic reproduction number